

ABSTRACT OF THE DISCLOSURE

The electromigration resistance of nitride capped Cu lines is significantly improved by treating the exposed planarized surface of inlaid Cu with a plasma containing NH_3 , depositing a silicon nitride capping layer at reduced temperatures, and then laser thermal annealing in N_2 to densify the silicon nitride capping layer. The resulting silicon nitride capping layer also exhibits improved barrier resistance to Cu migration and improved etch stop properties. Embodiments include Cu dual damascene structures formed in dielectric material having a dielectric constant (k) less than about 3.9.